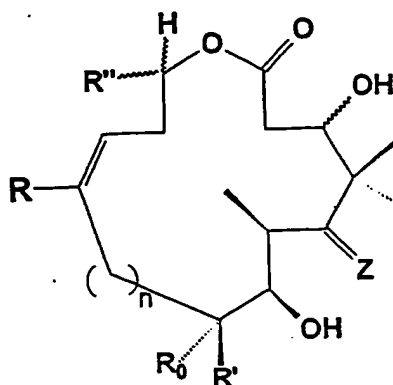


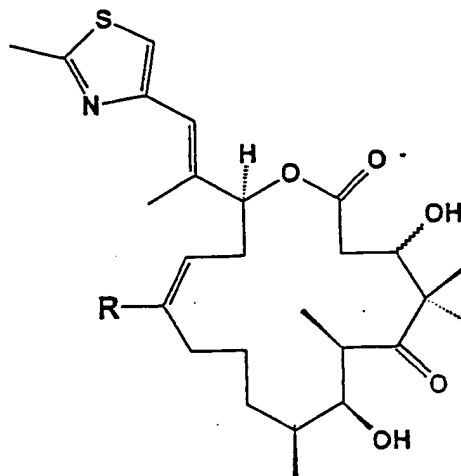
What is Claimed is:

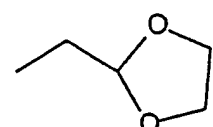
1. A compound having the structure:



wherein R, R₀, and R' are independently H, linear or branched chain alkyl, optionally substituted by hydroxy, alkoxy, carboxy, carboxaldehyde linear or branched alkyl or cyclic acetal, fluorine, NR₁R₂, N-hydroximino, or N-alkoxyimino, wherein R₁ and R₂ are independently H, phenyl, benzyl, linear or branched chain alkyl; wherein R'' is -CHY=CHX, or H, linear or branched chain alkyl, phenyl, 2-methyl-1,3-thiazolynyl, 2-furanyl, 3-furanyl, 4-furanyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, imidazolyl, 2-methyl-1,3-oxazolynyl, 3-indolyl or 6-indolyl; and wherein X is H, linear or branched chain alkyl, phenyl, 2-methyl-1,3-thiazolynyl, 2-furanyl, 3-furanyl, 4-furanyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, imidazolyl, 2-methyl-1,3-oxazolynyl, 3-indolyl or 6-indolyl; wherein Y is H or linear or branched chain alkyl; wherein Z is O, N(OR₃) or N-NR₄R₅, wherein R₃, R₄ and R₅ are independently H or a linear or branched alkyl; and wherein n is 0, 1, 2, or 3.

2. The compound of claim 1 having the structure:



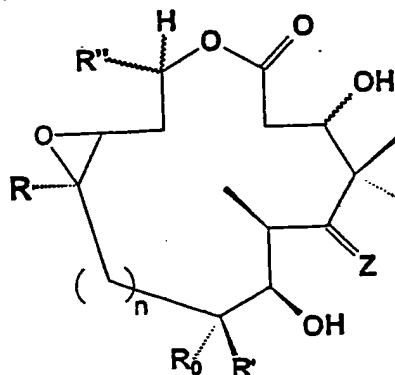
wherein R is H, methyl, ethyl, n-propyl, n-butyl, n-hexyl,  or

6

$(CH_2)_3-OH$.

1
2

3. A compound having the structure:



3
4

5

6

7

8

9

10

11

12

13

14

15

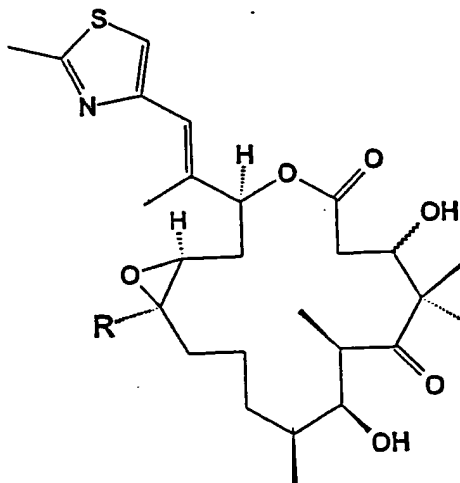
wherein R, R₀, and R' are independently H, linear or branched chain alkyl, optionally substituted by hydroxy, alkoxy, carboxy, carboxaldehyde linear or branched alkyl or cyclic acetal, fluorine, NR₁R₂, N-hydroximino, or N-alkoxyimino, wherein R₁ and R₂ are independently H, phenyl, benzyl, linear or branched chain alkyl; wherein R'' is -CHY=CHX, or H, linear or branched chain alkyl, phenyl, 2-methyl-1,3-thiazolynyl, 2-furanyl, 3-furanyl, 4-furanyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, imidazolyl, 2-methyl-1,3-oxazolynyl, 3-indolyl or 6-indolyl; and wherein X is H, linear or branched chain alkyl, phenyl, 2-methyl-1,3-thiazolynyl, 2-furanyl, 3-furanyl, 4-furanyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, imidazolyl, 2-methyl-1,3-oxazolynyl, 3-indolyl or 6-indolyl; wherein Y is H or linear or branched chain alkyl; wherein Z is O, N(OR₃) or N-NR₄R₅, wherein R₃, R₄ and R₅ are independently H or a linear or branched chain alkyl; and wherein n is 0, 1, 2, or 3.

1

4.

The compound of claim 3 having the structure:

2

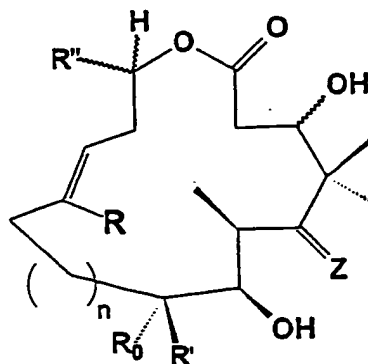


3
4

5

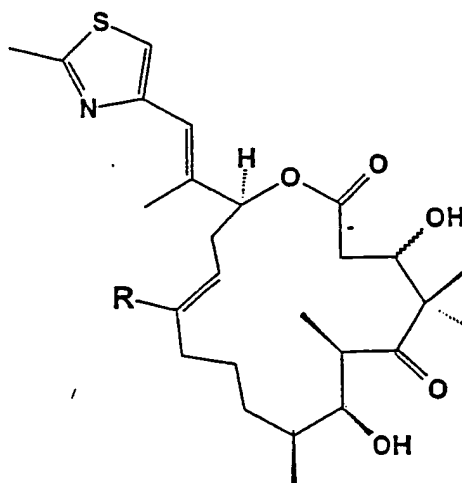
wherein R is H, methyl, ethyl, n-propyl, n-butyl or n-hexyl.

5. A compound having the structure:



wherein R, R₀, and R' are independently H, linear or branched chain alkyl, optionally substituted by hydroxy, alkoxy, carboxy, carboxaldehyde linear or branched alkyl or cyclic acetal, fluorine, NR₁R₂, N-hydroximino, or N-alkoxyimino, wherein R₁ and R₂ are independently H, phenyl, benzyl, linear or branched chain alkyl; wherein R'' is -CHY=CHX, or H, linear or branched chain alkyl, phenyl, 2-methyl-1,3-thiazolynyl, 2-furanyl, 3-furanyl, 4-furanyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, imidazolyl, 2-methyl-1,3-oxazolynyl, 3-indolyl or 6-indolyl; and wherein X is H, linear or branched chain alkyl, phenyl, 2-methyl-1,3-thiazolynyl, 2-furanyl, 3-furanyl, 4-furanyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, imidazolyl, 2-methyl-1,3-oxazolynyl, 3-indolyl or 6-indolyl; wherein Y is H or linear or branched chain alkyl; wherein Z is O, N(OR₃) or N-NR₄R₅, wherein R₃, R₄ and R₅ are independently H or a linear or branched chain alkyl; and wherein n is 0, 1, 2, or 3.

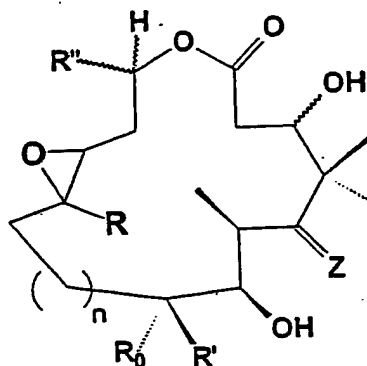
6. The compound of claim 5 having the structure:



wherein R is H, methyl, ethyl, n-propyl, n-butyl, n-hexyl or hydroxypropyl.

7. A compound having the structure:

2



3
4

5

6

7

8

9

10

11

12

13

14

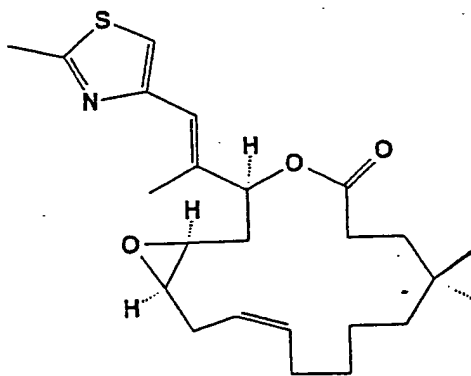
15.

wherein R, R₀, and R' are independently H, linear or branched chain alkyl, optionally substituted by hydroxy, alkoxy, carboxy, carboxaldehyde linear or branched alkyl or cyclic acetal, fluorine, NR₁R₂, N-hydroximino, or N-alkoxyimino, wherein R₁ and R₂ are independently H, phenyl, benzyl, linear or branched chain alkyl; wherein R'' is -CHY=CHX, or H, linear or branched chain alkyl, phenyl, 2-methyl-1,3-thiazolynyl, 2-furanyl, 3-furanyl, 4-furanyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, imidazolyl, 2-methyl-1,3-oxazolynyl, 3-indolyl or 6-indolyl; and wherein X is H, linear or branched chain alkyl, phenyl, 2-methyl-1,3-thiazolynyl, 2-furanyl, 3-furanyl, 4-furanyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, imidazolyl, 2-methyl-1,3-oxazolynyl, 3-indolyl or 6-indolyl; wherein Y is H or linear or branched chain alkyl; wherein Z is O, N(OR₃) or N-NR₄R₅, wherein R₃, R₄ and R₅ are independently H or a linear or branched chain alkyl or alkoxy; and wherein n is 0, 1, 2, or 3.

1

8. A compound having the structure:

2

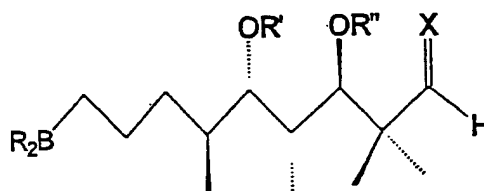


3

1

9. A compound having the structure:

2

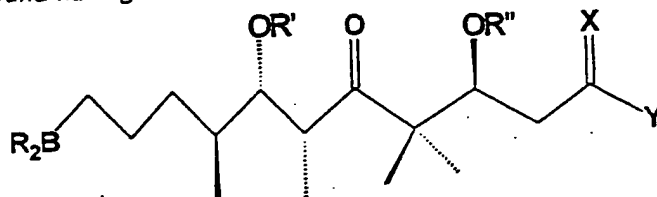


3
4

wherein R' and R'' are independently hydrogen, a linear or branched alkyl,

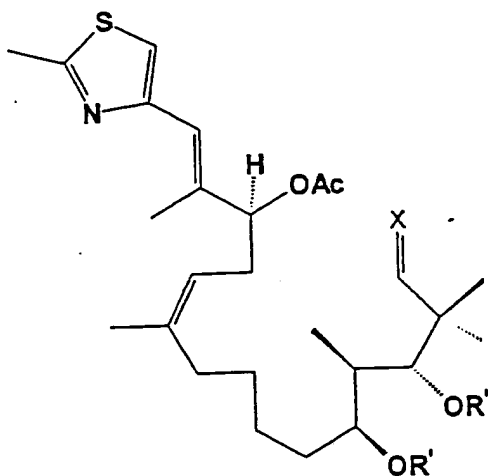
5 substituted or unsubstituted aryl or benzyl, trialkylsilyl, dialkylarylsilyl,
6 alkyldiarylsilyl, a linear or branched acyl, substituted or unsubstituted aroyl or
7 benzoyl; wherein X is oxygen, $(OR^*)_2$, $(SR^*)_2$, $-(O-(CH_2)_n-O)-$, $-(O-(CH_2)_n-S)-$ or $-(S-$
8 $(CH_2)_n-S)-$; wherein R^* is a linear or branched alkyl, substituted or unsubstituted aryl
9 or benzyl; wherein R_2B is a linear, branched or cyclic alkyl or substituted or
10 unsubstituted aryl or benzyl boranyl moiety; and wherein n is 2, 3 or 4.

1 10. A compound having the structure:
2



3 wherein R' and R'' are independently hydrogen, a linear or branched alkyl,
4 substituted or unsubstituted aryl or benzyl, trialkylsilyl, dialkylarylsilyl,
5 alkyldiarylsilyl, a linear or branched acyl, substituted or unsubstituted aroyl or
6 benzoyl; wherein X is oxygen, $(OR^*)_2$, $(SR^*)_2$, $-(O-(CH_2)_n-O)-$, $-(O-(CH_2)_n-S)-$ or $-(S-$
7 $(CH_2)_n-S)-$; wherein R^* is a linear or branched alkyl, substituted or unsubstituted aryl
8 or benzyl; wherein R_2B is a linear, branched or cyclic alkyl or substituted or
9 unsubstituted aryl or benzyl boranyl moiety; wherein Y is OH, linear or branched
10 chain alkoxy, trimethylsilyloxy, t-butyl dimethylsilyloxy or methyl diphenylsilyloxy; and
11 wherein n is 2, 3 or 4.
12

1 11. A compound having the structure:
2



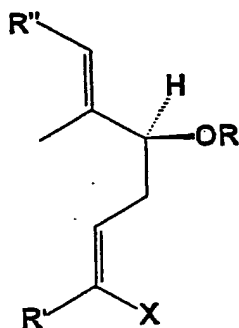
3 wherein R' and R'' are independently hydrogen, a linear or branched alkyl,
4 substituted or unsubstituted aryl or benzyl, trialkylsilyl, dialkylarylsilyl,
5 alkyldiarylsilyl, a linear or branched acyl, substituted or unsubstituted aroyl or
6 benzoyl; wherein X is oxygen, $(OR)_2$, $(SR)_2$, $-(O-(CH_2)_n-O)-$, $-(O-(CH_2)_n-S)-$ or $-(S-$
7 $(CH_2)_n-S)-$; wherein n is 2, 3 or 4.

8 (CH₂)_n-S-; and wherein n is 2, 3 or 4.

1 12. The compound of claim 11 wherein R' is TBS, R'' is TPS and X is (OMe)₂.

1 13. A compound having the structure:

2



3

4

5

6

7

8

9

10

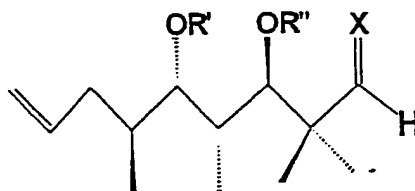
11

wherein R is hydrogen, a linear or branched alkyl, alkoxyalkyl, substituted or unsubstituted aryloxyalkyl, linear or branched acyl, substituted or unsubstituted aroyl or benzoyl; wherein X is a halogen; wherein R'' is H, linear or branched chain alkyl, phenyl, 2-methyl-1,3-thiazolynyl, 2-furanyl, 3-furanyl, 4-furanyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, imidazolyl, 2-methyl-1,3-oxazolynyl, 3-indolyl or 6-indolyl; and wherein Y is H or linear or branched chain alkyl; wherein R' is H, linear or branched chain alkyl, hydroxymethyl, hydroxypropyl; alkyl carboxaldehyde, alkyl carboxaldehyde linear or cyclic acetal; and X is a halide.

1 14. The compound of claim 13 wherein R is acetyl and X is iodo.

1 15. A compound having the structure:

2



3

4

5

6

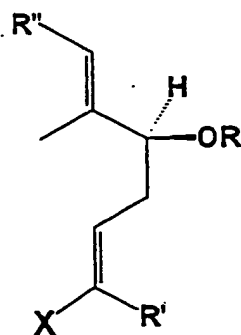
7

8

wherein R' and R'' are independently hydrogen, a linear or branched alkyl, substituted or unsubstituted aryl or benzyl, trialkylsilyl, dialkylarylsilyl, alkyl diarylsilyl, a linear or branched acyl, substituted or unsubstituted aroyl or benzoyl; wherein X is oxygen, (OR)₂, (SR)₂, -(O-(CH₂)_n-O)-, -(O-(CH₂)_n-S)- or -(S-(CH₂)_n-S)-; and wherein n is 2, 3 or 4.

1 16. A compound having the structure:

2



3

4

5

6

7

8

9

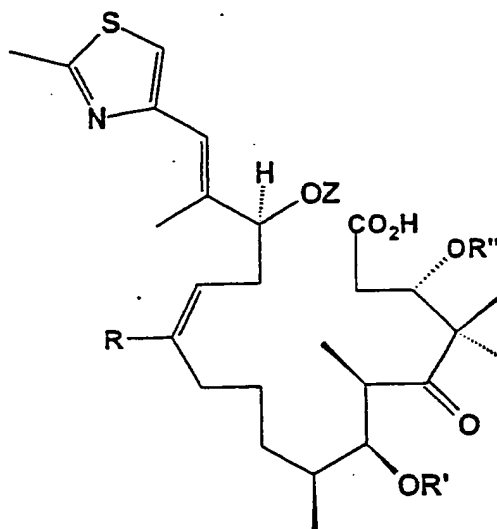
10

wherein R is hydrogen, a linear or branched alkyl, alkoxyalkyl, substituted or unsubstituted aryloxyalkyl, linear or branched acyl, substituted or unsubstituted aroyl or benzoyl; wherein X is a halogen; wherein R' is H, linear or branched chain alkyl, alkyl carboxaldehyde, alkyl carboxaldehyde linear or cyclic acetal; wherein R'' is H, linear or branched chain alkyl, phenyl, 2-methyl-1,3-thiazolynyl, 2-furanyl, 3-furanyl, 4-furanyl, 2-pyridyl, 3-pyridyl, 4-pyridyl, imidazolyl, 2-methyl-1,3-oxazolynyl, 3-indolyl or 6-indolyl; and wherein Y is H or linear or branched chain alkyl.

1

17. A compound having the structure:

2



3

4

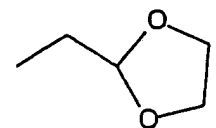
5

6

7

8

wherein R is hydrogen, methyl, ethyl, n-propyl, n-hexyl, CO₂Et,

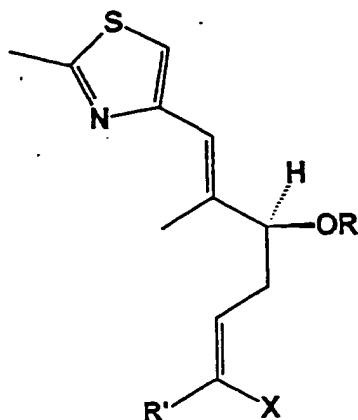


CH₂OH; or (CH₂)₃-OH; wherein R' and R'' are independently hydrogen, a linear or branched alkyl, substituted or unsubstituted aryl or benzyl, trialkylsilyl, dialkylarylsilyl, alkyldiarylsilyl, a linear or branched acyl, substituted or unsubstituted aroyl or benzoyl; and wherein Z is hydrogen, or linear or branched chain alkyl.

1

18. A method of preparing a Z-haloalkene ester having the structure:

2



3

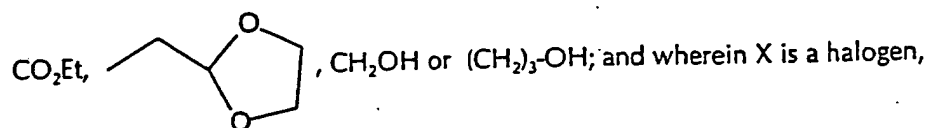
4

5

6

wherein R is hydrogen, a linear or branched alkyl, alkoxyalkyl, substituted or unsubstituted aryloxyalkyl, linear or branched acyl, substituted or unsubstituted aroyl or benzoyl; wherein R' is hydrogen, methyl, ethyl, n-propyl, n-hexyl,

7



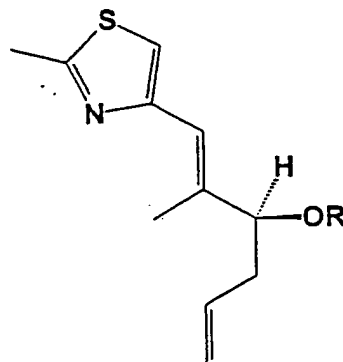
8

9

10

which comprises

(a) oxidatively cleaving a compound having the structure:



11

12

13

14

(b) under suitable conditions to form an aldehyde intermediate; and
condensing the aldehyde intermediate with a halomethylene transfer agent under suitable conditions to form the Z-haloalkene ester.

1

19. The method of claim 18 wherein X is iodine.

1

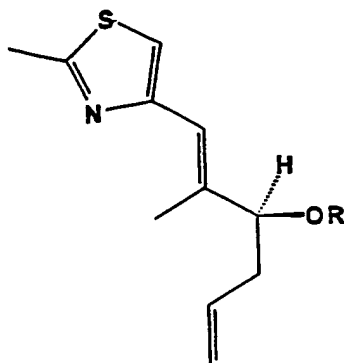
20. The method of claim 18 wherein the halomethylene transfer agent is Ph₃P=CR'I or (Ph₃P⁺CHR'I)⁻

2

1

21. A method of preparing an optically pure compound having the structure:

2



3

4

5

6

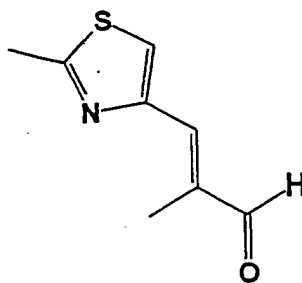
7

8

9

wherein R is hydrogen, a linear or branched alkyl, alkoxyalkyl, substituted or unsubstituted aryloxyalkyl, linear or branched acyl, substituted or unsubstituted aroyl or benzoyl, which comprises:

- (a) condensing an allylic organometallic reagent with an unsaturated aldehyde having the structure:



10

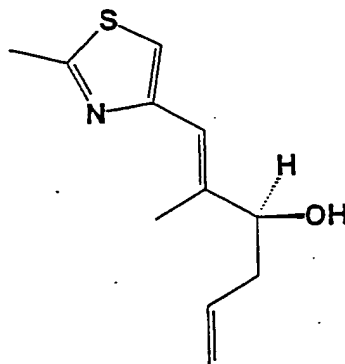
11

12

13

14

under suitable conditions to form an alcohol, and, optionally concurrently therewith, optically resolving the alcohol to form an optically pure alcohol having the structure:



15

16

17

- (b) alkylating or acylating the optically pure alcohol formed in step (a) under suitable conditions to form the optically pure compound.

1

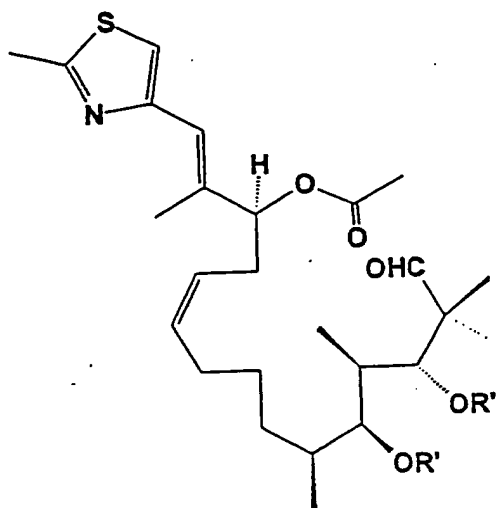
2

22. The method of claim 21 wherein the allylic organometallic reagent is an allyl(trialkyl)stannane.

1 23. The method of claim 21 wherein the condensing step is effected using a reagent
2 comprising a titanium tetraalkoxide and an optically active catalyst.

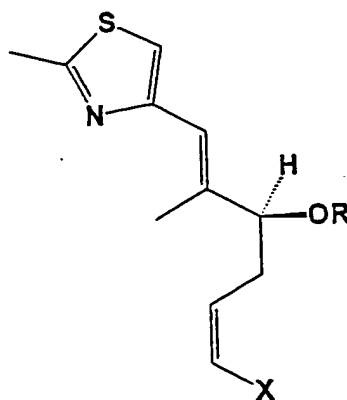
1 24. The method of claim 23 wherein the optically active catalyst is
2 S(-)BINOL.

1 25. A method of preparing an open-chain aldehyde having the structure:
2



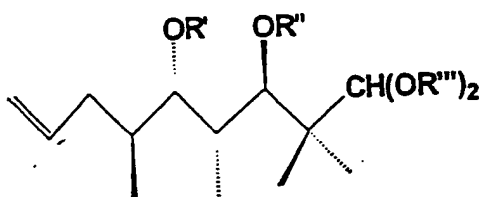
3 wherein R' and R'' are independently hydrogen, a linear or branched alkyl,
4 substituted or unsubstituted aryl or benzyl, trialkylsilyl, dialkylarylsilyl,
5 alkylarylsilyl, a linear or branched acyl, substituted or unsubstituted aroyl or
6 benzoyl, which comprises:
7

8 (a) cross-coupling a haloolefin having the structure:
9



10 wherein R is a linear or branched alkyl, alkoxyalkyl, substituted or
11 unsubstituted aryloxyalkyl, trialkylsilyl, arylalkylsilyl, dialkylarylsilyl,
12 triarylsilyl, linear or branched acyl, substituted or unsubstituted aroyl or
13 benzoyl, and X is a halogen, with a terminal olefin having the structure:
14

15



16

17

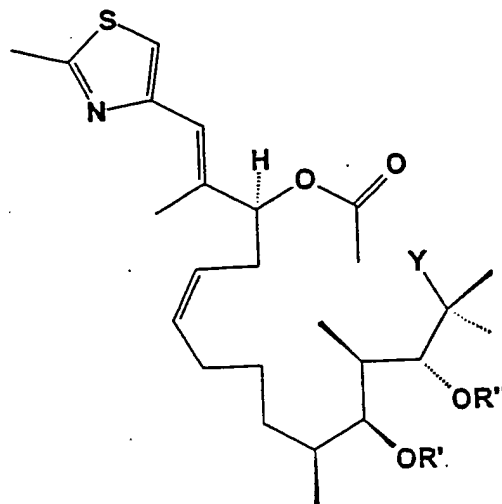
18

19

20

21

wherein $(OR'')_2$ is $(OR_0)_2$, $(SR_0)_2$, $-(O-(CH_2)_n-O)-$, $-(O-(CH_2)_n-S)-$ or $-(S-(CH_2)_n-S)-$ where R_0 is a linear or branched alkyl, substituted or unsubstituted aryl or benzyl; and wherein n is 2, 3 or 4, under suitable conditions to form a cross-coupled compound having the structure:



22

23

24

25

26

27

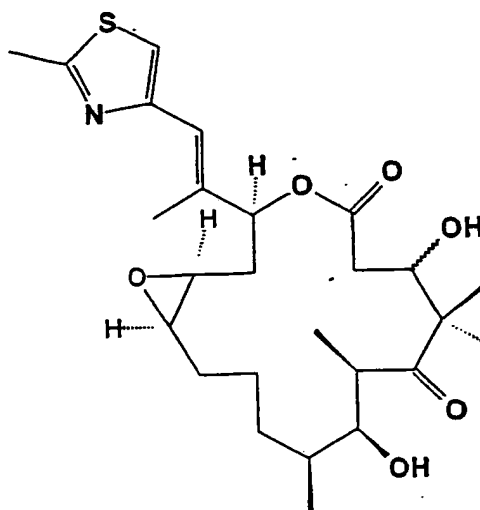
wherein Y is $CH(OR^*)_2$ where R^* is a linear or branched alkyl, alkoxyalkyl, substituted or unsubstituted aryloxyalkyl; and

(b) deprotecting the cross-coupled compound formed in step (a) under suitable conditions to form the open-chain compound.

1

26. A method of preparing an epothilone having the structure:

2



3

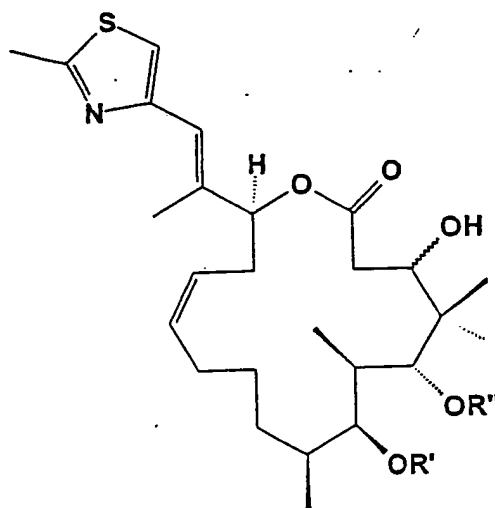
4

which comprises:

5

(a) deprotecting a cyclized compound having the structure:

6



7

8

9

10

11

12

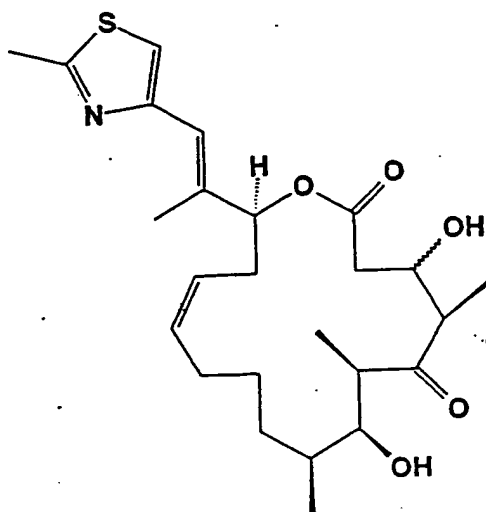
13

14

15

wherein R' and R'' are independently hydrogen, a linear or branched alkyl, substituted or unsubstituted aryl or benzyl, trialkylsilyl, dialkylarylsilyl, alkyl diarylsilyl, a linear or branched acyl, substituted or unsubstituted aroyl or benzoyl, under suitable conditions to form a deprotected cyclized compound and oxidizing the deprotected cyclized compound under suitable conditions to form a desoxyepothilone having the structure:

16



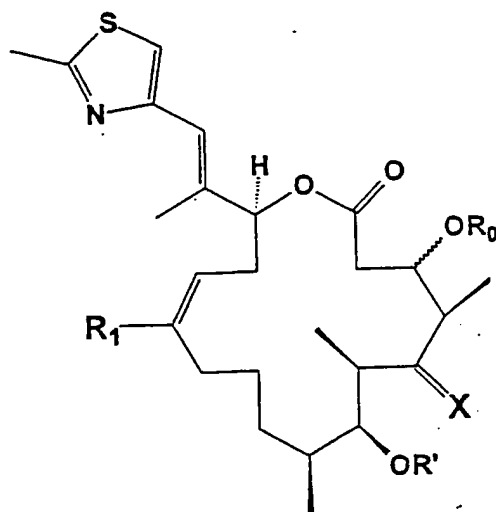
17
18
19
20
21

and

(b) epoxidizing the desoxyepothilone formed in step (a) under suitable conditions to form the epothilone.

1
2

27. A method of preparing an epothilone precursor having the structure:

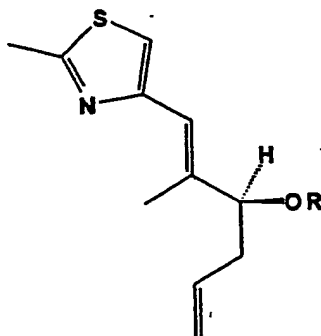


3
4
5
6
7
8
9
10

wherein R₁ is hydrogen or methyl; wherein X is O, or a hydrogen and OR'', each singly bonded to carbon; and wherein R₀, R' and R'' are independently hydrogen, a linear or branched alkyl, substituted or unsubstituted aryl or benzyl, trialkylsilyl, dialkylarylsilyl, alkyldiarylsilyl, a linear or branched acyl, substituted or unsubstituted aroyl or benzoyl, which comprises

(a) coupling a compound having the structure:

11

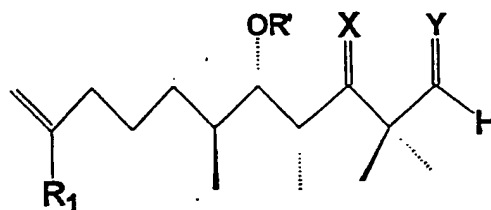


12

13

14

wherein R is an acetyl, with an aldehyde having the structure:



15

16

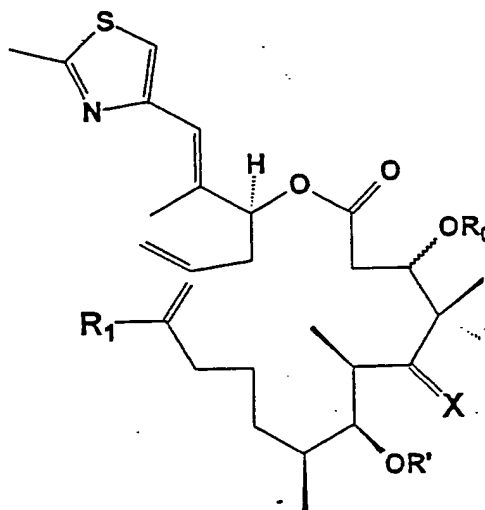
17

18

19

20

wherein Y is oxygen, under suitable conditions to form an aldol intermediate and optionally protecting the aldol intermediate under suitable conditions to form an acyclic ephthilone precursor having the structure:



21

22

23

(b) subjecting the acyclic ephthilone precursor to conditions leading to intramolecular olefin metathesis to form the ephthilone precursor.

1

28. The method of claim 27 wherein the conditions leading to intramolecular olefin metathesis require the presence of an organometallic catalyst.

2

1

29. The method of claim 27 wherein the catalyst is a Ru or Mo complex.

1

30. A pharmaceutical composition for treating cancer comprising a compound of claim 1,

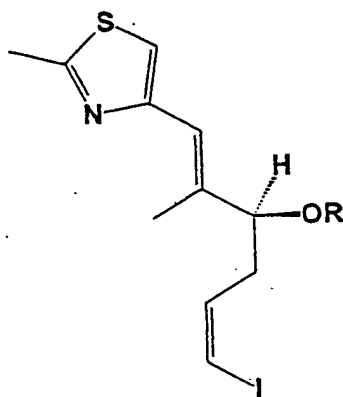
3, 5, 7, or 8 and a pharmaceutically suitable carrier.

31. A method of treating cancer in a subject suffering therefrom comprising administering to the subject a therapeutically effective amount of a compound of claim 1, 3, 5, 7 or 8 and a pharmaceutically suitable carrier.

32. The method of claim 31 wherein the cancer is a solid tumor.

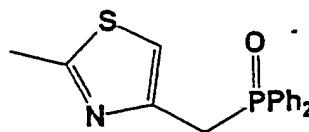
33. The method of claim 31 wherein the cancer is breast cancer.

34. A method of preparing a Z-iodoalkene ester having the structure:

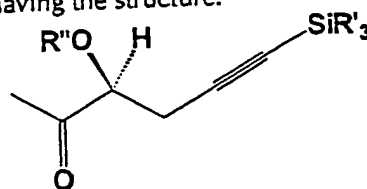


wherein R is hydrogen, a linear or branched alkyl, alkoxyalkyl, substituted or unsubstituted aryloxyalkyl, linear or branched acyl, substituted or unsubstituted aroyl or benzoyl, which comprises

(a) coupling a compound having the structure:

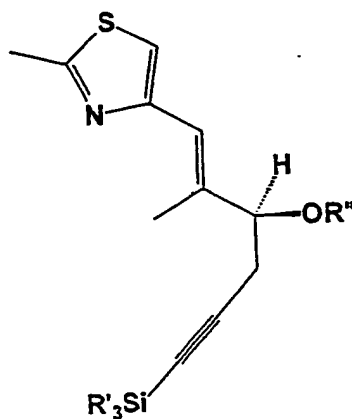


with a methyl ketone having the structure:

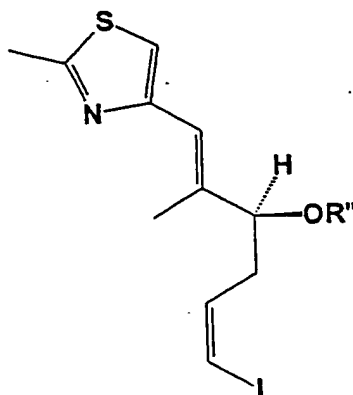


wherein R' and R'' are independently a linear or branched alkyl,

alkoxyalkyl, substituted or unsubstituted aryl or benzyl, under suitable conditions to form a compound having the structure:



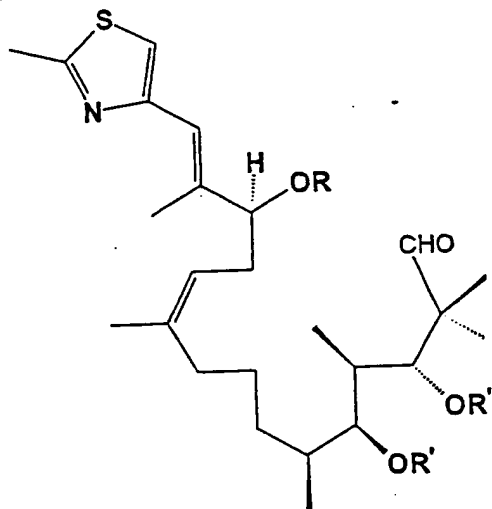
(b) treating the compound formed in step (a) under suitable conditions to form a Z-iodoalkene having the structure:



and

(c) deprotecting and acylating the Z-iodoalkene formed in step (b) under suitable conditions to form the Z-iodoalkene ester.

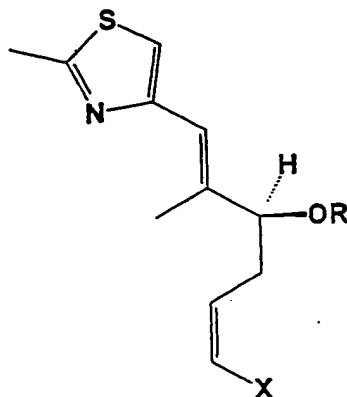
35. A method of preparing an open-chain aldehyde having the structure:



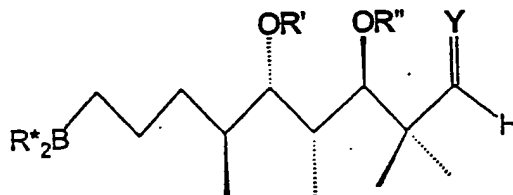
wherein R is a linear or branched alkyl, alkoxyalkyl, substituted or unsubstituted

aryloxyalkyl, trialkylsilyl, aryldialkylsilyl, diarylalkylsilyl, triarylsilyl, linear or branched acyl, substituted or unsubstituted aroyl or benzoyl; and wherein R' and R'' are independently hydrogen, a linear or branched alkyl, substituted or unsubstituted aryl or benzyl, trialkylsilyl, dialkylarylsilyl, alkylarylsilyl, a linear or branched acyl, substituted or unsubstituted aroyl or benzoyl, which comprises:

(a) cross-coupling a haloolefin having the structure:

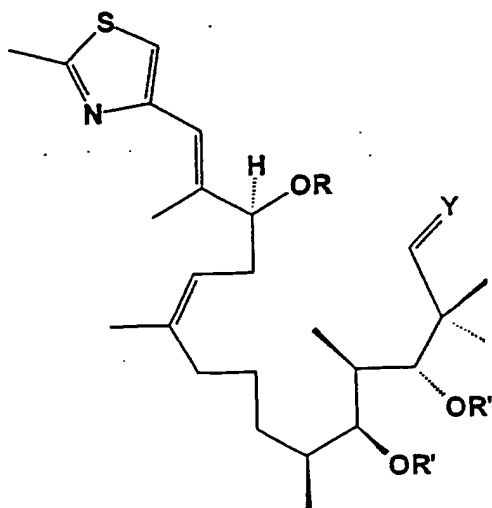


wherein X is a halogen, with a terminal hydroborane having the structure:



wherein R₂B is a linear, branched or cyclic alkyl or substituted or unsubstituted aryl or benzyl boranyl moiety; wherein Y is (OR₀)₂, (SR₀)₂, - (O-(CH₂)_n-O)-, -(O-(CH₂)_n-S)- or -(S-(CH₂)_n-S)- where R₀ is a linear or branched alkyl, substituted or unsubstituted aryl or benzyl; and wherein n is 2, 3 or 4, under suitable conditions to form a cross-coupled compound having the structure:

23



24

25

26

27

and

- (b) deprotecting the cross-coupled compound formed in step (a) under suitable conditions to form the open-chain aldehyde.

1

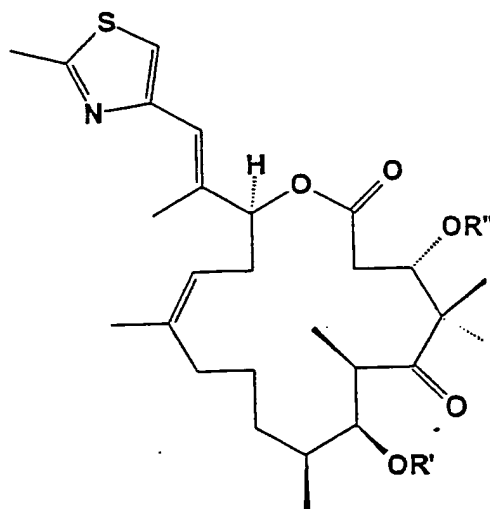
36. The method of claim 35 wherein R is acetyl; R' is TBS; R'' is TPS; R₂B is derived from 9-BBN; and Y is (OMe)₂.

2

1

37. A method of preparing a protected epothilone having the structure:

2



3

4

5

6

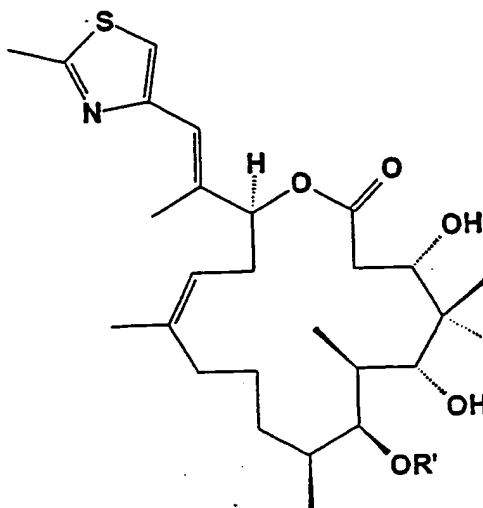
7

8

wherein R' and R'' are independently hydrogen, a linear or branched alkyl, substituted or unsubstituted aryl or benzyl, trialkylsilyl, dialkyl-arylsilyl, alkyldiarylsilyl, a linear or branched acyl, substituted or unsubstituted aroyl or benzoyl, which comprises:

- (a) monoprotecting a cyclic diol having the structure:

9



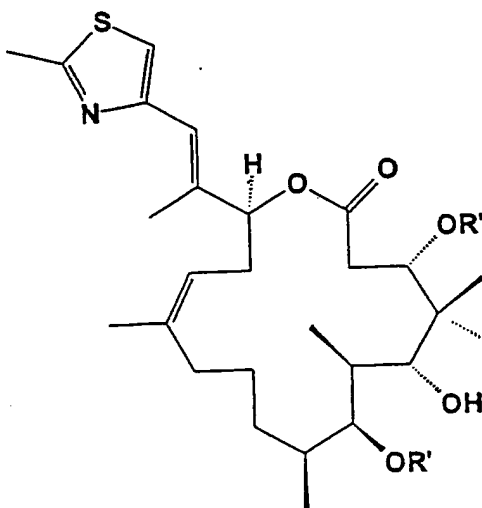
10

11

12

13

under suitable conditions to form a cyclic alcohol having the structure:



14

15

16

17

and

(b) oxidizing the cyclic alcohol formed in step (a) under suitable conditions to form the protected epothilone.

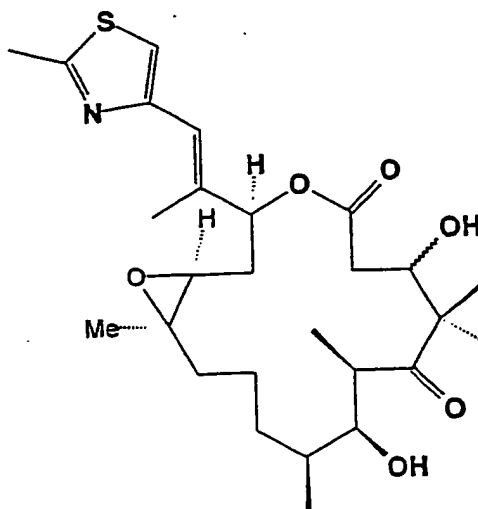
1

38. The method of claim 37 wherein R' and R'' are TBS.

1

39. A method of preparing an epothilone having the structure:

2



3

4

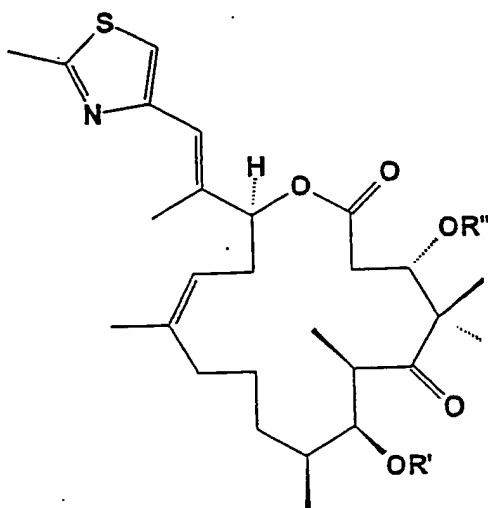
which comprises:

5

(a) deprotecting a protected cyclic ketone having the structure:

6

7



8

9

10

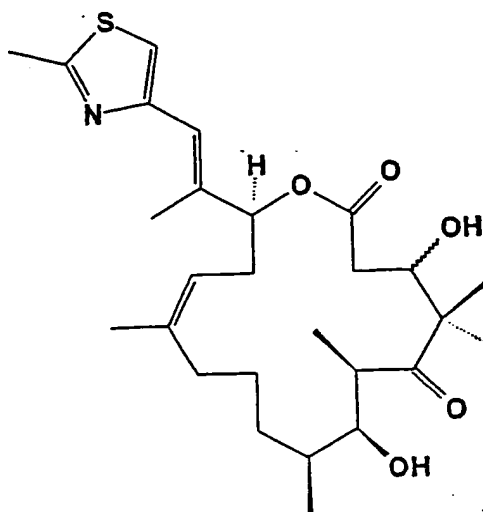
11

12

13

wherein R' and R'' are independently hydrogen, a linear or branched alkyl, substituted or unsubstituted aryl or benzyl, trialkylsilyl, dialkylarylsilyl, alkyldiarylsilyl, a linear or branched acyl, substituted or unsubstituted aroyl or benzoyl, under suitable conditions to form a desoxyepothilone having the structure:

14



15

16

17

18

and

- (b) epoxidizing the desoxyepothilone formed in step (a) under suitable conditions to form the epothilone.

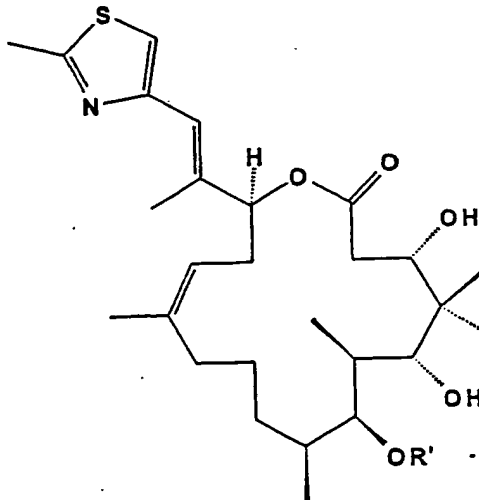
1

40. The method of claim 39 wherein R' and R'' are TBS.

1

41. A method of preparing a cyclic diol having the structure:

2



3

4

5

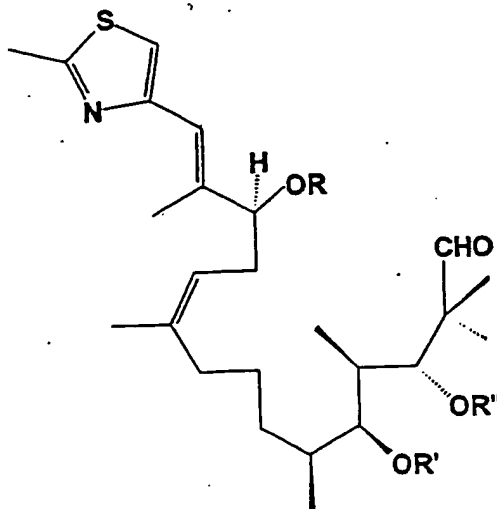
6

7

wherein R' is a hydrogen, a linear or branched alkyl, substituted or unsubstituted aryl or benzyl, trialkylsilyl, dialkylarylsilyl, alkylidiarylsilyl, a linear or branched acyl, substituted or unsubstituted aroyl or benzoyl, which comprises:

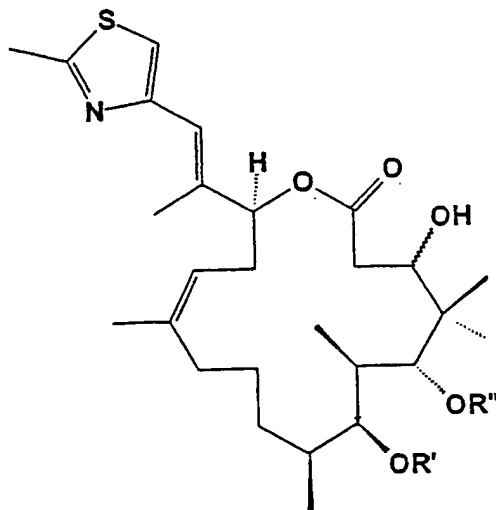
- (a) cyclizing an open-chain aldehyde having the structure:

8



9
10
11
12
13
14
15
16
17
18

wherein R is a linear or branched alkyl, alkoxyalkyl, substituted or unsubstituted aryloxyalkyl, trialkylsilyl, aryldialkylsilyl, diarylalkylsilyl, triarylsilyl, linear or branched acyl, substituted or unsubstituted aroyl or benzoyl; and wherein R' is a hydrogen, a linear or branched alkyl, substituted or unsubstituted aryl or benzyl, trialkylsilyl, dialkylarylsilyl, alkylarylsilyl, a linear or branched acyl, substituted or unsubstituted aroyl or benzoyl under suitable conditions to form an enantiomeric mixture of a protected cyclic alcohol having the structure:

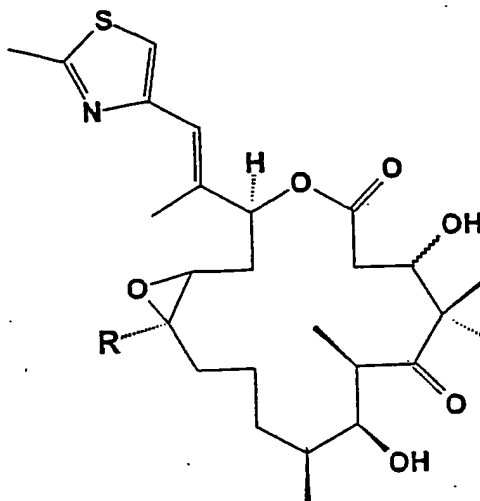


19
20
21
22
23
24
25
26

- said mixture comprising an α - and a β -alcohol component;
- (b) optionally isolating and oxidizing the α -alcohol formed in step (a) under suitable conditions to form a ketone and thereafter reducing the ketone under suitable conditions to form an enantiomeric mixture of the protected cyclic alcohol comprising substantially the β -alcohol; and
- (c) treating the protected cyclic alcohol formed in step (a) or (b) with a deprotecting agent under suitable conditions to form the cyclic diol.

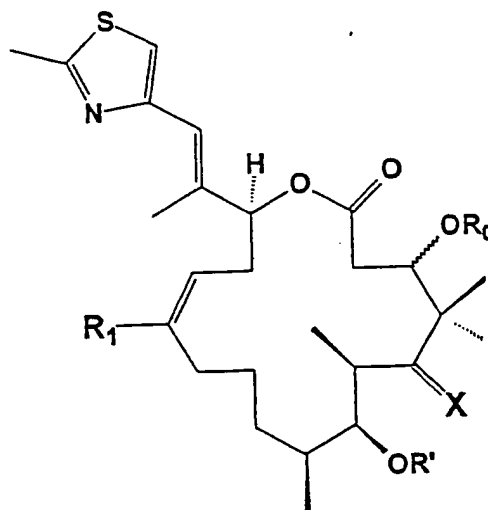
- 1 42. The method of claim 41 wherein R' is TBS and R'' is TPS.

- 1 43. A purified compound having the structure:
2
3
4



- 5 wherein R is hydrogen, methyl, ethyl, propyl, hexyl, hydroxymethyl or
6 hydroxypropyl; wherein X is O; and wherein R₀, R' and R'' are independently
7 hydrogen or acetyl.
8

- 1 44. A purified compound having the structure:
2



- 3 wherein R₁ is hydrogen, methyl, ethyl, propyl, hexyl, hydroxymethyl or
4 hydroxypropyl; wherein X is O; and wherein R₀, R' and R'' are independently
5 hydrogen or acetyl.
6

- 1 45. A composition comprising an amount of the compound of claim 1, 2, 3, 4, 5, 6, 7, 8,
2 43 or 44 effective to inhibit the growth of multidrug resistant cells and a

3 pharmaceutically acceptable carrier.

1 46. The composition of claim 45, further comprising an amount of a cytotoxic agent.

1 47. The composition of claim 46, wherein the cytotoxic agent is an anticancer agent.

1 48. The composition of claim 47, wherein the anticancer agent is adriamycin.

1 49. The composition of claim 47, wherein the anticancer agent is vinblastin.

1 50. The composition of claim 47, wherein the anticancer agent is paclitaxel.

1 51. The composition of claim 45, wherein the effective amount of the compound is
2 between about 0.01 mg/kg to about 25 mg/kg of body weight.

1 52. A method of inhibiting the growth of multidrug resistant cells comprising contacting
2 the multidrug resistant cells with an amount of the compound of claim 1, 2, 3, 4, 5,
3 6, 7, 8, 43 or 44 effective to inhibit the growth of multidrug resistant cells in
4 combination with a pharmaceutically acceptable carrier.

1 53. The method of claim 52, further comprising administering an amount of a cytotoxic
2 agent.

1 54. The method of claim 53, wherein the cytotoxic agent is an anticancer agent.

1 55. The method of claim 54, wherein the anticancer agent is adriamycin.

1 56. The method of claim 55, wherein the anticancer agent is vinblastin.

1 57. The method of claim 55, wherein the anticancer agent is paclitaxel.

1 58. The method of claim 55, wherein the effective amount of the compound is between
2 about 0.01 mg/kg to about 25 mg/kg of body weight.